

## **IN THE CLAIMS**

We claim:

1. A deflatable catheter assembly comprising:
  - a catheter shaft having a catheter proximal section and a catheter distal section, said catheter distal section being more flexible than said catheter proximal section;
  - a tendon disposed within a first lumen of said catheter shaft, said first lumen being approximately centrally located within said catheter shaft at said catheter proximal section and said first lumen located off-center of said catheter shaft at said catheter distal section, said tendon being able to deflect said catheter distal section when being pulled on; and
  - a catheter handle coupled to said catheter shaft, said catheter handle including a first control mechanism to control said tendon.
2. A deflatable catheter assembly as in claim 1 further comprises a needle disposed within a second lumen of said catheter shaft.
3. A deflatable catheter assembly as in claim 2 wherein said needle is approximately centrally located within said catheter shaft at said catheter distal section.
4. A deflatable catheter assembly as in claim 1 further comprises a plurality of needles each of which is disposed within a second lumen of said catheter shaft.

5. A deflectable catheter assembly as in claim 1 further comprises,  
an axial spine disposed around and over a first section of said tendon, said first section being substantially aligned with said catheter proximal section, said axial spine to resist axial compression along said catheter proximal section.
6. A deflectable catheter assembly as in claim 1 further comprises,  
an axial spine disposed around and over a first section of said tendon, said first section being substantially aligned with said catheter proximal section, said axial spine to resist axial compression along said catheter proximal section; and  
a flexible tendon sheath coupling to said axial spine, said flexible tendon sheath extending a second section of said tendon and said second section being substantially aligned with said catheter distal section.
7. A deflectable catheter assembly as in claim 1 wherein said tendon comprises,  
an axial spine disposed over a first section of said tendon, said first section being substantially aligned with said catheter proximal section of said catheter shaft, said axial spine to resist axial compression along said catheter proximal section;  
a first plurality of slip bands disposed around a distal section of said axial spine;  
a second plurality of slip bands disposed around a proximal section of said axial spine; and

a flexible tendon sheath coupling to said axial spine, said flexible tendon sheath extending a second section of said tendon and said second section being substantially aligned with said catheter distal section.

8. A deflatable catheter assembly as in claim 1 further comprising:

a tip electrode located at the tip of said catheter distal section and coupled to a conductive lead that extends out of said catheter shaft.

9. A deflatable catheter assembly as in claim 1 further comprising:

a tip electrode located at the tip of said catheter distal section and coupled to a conductive lead that extends out of said catheter shaft; and

at least one additional electrode located proximally along said catheter distal section and closely to said tip electrode, said at least one additional electrode coupled to another conductive lead that extends out of said catheter shaft, wherein said tip electrode and said at least one additional electrode forming a bipolar electrode system.

10. A deflatable catheter assembly as in claim 1 further comprising:

a tip electrode located at the tip of said catheter distal section and coupled to a conductive lead that extends out of said catheter shaft;

a medical device within a second lumen of said catheter shaft;

wherein said tip electrode having an opening to allow said medical device to pass therethrough, and

wherein said catheter handle includes a second control mechanism to control said medical device.

11. A deflatable catheter assembly as in claim 10 wherein said medical device is a needle.

12. A deflatable catheter assembly as in claim 10 further comprising:

at least one additional electrode located proximally along said catheter distal section and closely to said tip electrode, said at least one additional electrode coupled to another conductive lead that extends out of said catheter shaft, wherein said tip electrode and said at least one additional electrode forming a bipolar electrode system.

13. A deflatable catheter assembly as in claim 10 wherein said tip electrode is exposed only at a surface section of said catheter shaft proximate to where said medical device exits said catheter shaft to reach a target site.

14. A deflatable catheter assembly as in claim 13 further comprising:

at least one additional electrode located proximally along said catheter distal section and closely to said tip electrode, said at least one additional electrode coupled to another conductive lead that extends out of said catheter shaft, wherein said tip electrode and said at least one additional electrode forming a bipolar electrode system.

15. A deflatable catheter assembly as in claim 1 further comprising:
- a tip electrode located at the tip of said catheter distal section and coupled to a conductive lead that extends out of said catheter shaft; and
- at least one additional electrode located proximally along said catheter distal section, said at least one additional electrode buried beneath a surface of said catheter distal section and coupled to another conductive lead that extends out of said catheter shaft, wherein said catheter distal section includes an opening to expose said at least one additional electrode, and wherein said tip electrode and said at least one additional electrode forming a bipolar electrode system.
16. A deflatable catheter assembly as in claim 1 wherein said catheter proximal section is further divided into a middle catheter proximal section and a catheter proximal section wherein said middle catheter proximal section is more flexible than said catheter proximal section.
17. A deflatable catheter assembly as in claim 1 wherein catheter proximal section is further divided into a middle catheter proximal section and a catheter proximal section wherein said middle catheter proximal section is more flexible than said catheter proximal section and is less flexible than said catheter distal section.
18. A deflatable catheter assembly as in claim 2 wherein said first control mechanism includes a tendon control mechanism that deflects or relaxes a tendon included in said tendon to deflect said catheter distal section and wherein a second control mechanism is included in said catheter handle to control said needle.

19. A deflectable catheter assembly as in claim 1 further comprising:  
a pre-shaped guide sheath disposed around said catheter shaft and extending from said catheter distal section to said catheter proximal section, said pre-shaped guide sheath being able to facilitate the maneuvering of said catheter shaft through tortuous pathways.
20. A deflectable catheter assembly as in claim 1 further comprising:  
a pre-shaped guide sheath disposed around said catheter shaft and extending from said catheter distal section to said catheter proximal section, said pre-shaped guide sheath having at least one angular bend at a distal end to facilitate the maneuvering of said catheter shaft through tortuous pathways.
21. A deflectable catheter assembly as in claim 1 further comprising:  
a pre-shaped guide sheath disposed around said catheter shaft and extending from said catheter distal section to said catheter proximal section, said pre-shaped guide sheath having a dual-angular bend at a distal end to facilitate the maneuvering of said catheter shaft through tortuous pathways.
22. A deflectable catheter assembly as in claim 1 further comprises a needle disposed within a needle tube, said needle tube disposed within a second lumen of said catheter shaft, said needle and said needle tube being extendable from and retractable into said catheter distal section and said needle being extendable from and retractable into said needle tube.

23. A deflatable catheter assembly as in claim 1 further comprises a plurality of needle assemblies, disposed within a second lumen of said catheter shaft, each of said plurality of needle assemblies being extendable from and retractable into said catheter distal section.
24. A deflatable catheter assembly as in claim 1 wherein further comprises a plurality of needles, each of said plurality of needles being disposed within a needle tube, each of said needle tubes disposed within a second lumen of said catheter shaft, each of said plurality of needles and said needle tubes being independently extendable from and retractable into said catheter distal section and each of said plurality of needles being independently extendable from and retractable into each of said needle tubes.
25. A deflatable catheter assembly as in claim 1 further comprises a plurality of needles and at least one inflatable balloon coupling to said plurality of needles, said inflatable balloon, when inflated, directs said plurality of needles to desired target sites.
26. A deflatable catheter assembly as in claim 1 further comprises at least one needle having a divergent angle disposed within a needle tube, said needle tube disposed within a second lumen of said catheter shaft, said at least one needle and said needle tube being extendable from and retractable into said catheter distal section

and said at least one needle being extendable from and retractable into said needle tube.

27. A deflatable catheter assembly as in claim 1 further comprises at least one needle having a plurality of injection openings disposed within a needle tube, said needle tube disposed within a second lumen of said catheter shaft, said at least one needle and said needle tube being extendable from and retractable into said catheter distal section and said at least one needle being extendable from and retractable into said needle tube.

28. A deflatable catheter assembly as in claim 1 further comprises a needle disposed within a second lumen of said catheter shaft and a needle stop mechanism to control the travel distance of said needle.

29. A deflatable catheter assembly comprising:

a catheter shaft having a catheter proximal section and a catheter distal section, said catheter distal section being more flexible than said catheter proximal section;

a tendon and a needle disposed within a first lumen of said catheter shaft, said tendon being able to deflect said catheter distal section when being pulled on; and

a catheter handle coupled to said catheter shaft at said catheter proximal section, said catheter handle including a first control mechanism to control said tendon and a second control mechanism to control said needle;



wherein along said catheter proximal section, said tendon is approximately centrally located and said needle is wrapped around said tendon, and

wherein along said catheter distal section, said tendon is located off-center of said catheter shaft to allow defection of said catheter distal section and said needle is not wrapped around said tendon.

30. A deflectable catheter assembly as in claim 29 wherein said needle is located approximately at the center of said catheter shaft at said catheter distal section.
31. A deflectable catheter assembly as in claim 29 wherein each of a plurality of needles, which includes said needle, is wrapped around said tendon.
32. A deflectable catheter assembly as in claim 29 further couples to a stiffening member, said stiffening member being slidably moveably along said catheter shaft and being able to control the deflection point of said catheter shaft.
33. A deflectable catheter assembly as in claim 29 further comprises an axial spine disposed around said tendon at a first section of said tendon, said first section being substantially aligned with said catheter proximal section, and said axial spine to resist axial compression along said catheter proximal section.
34. A deflectable catheter assembly as in claim 29 further comprises,  
an axial spine disposed around a first section of said tendon, said first section being substantially aligned with said catheter proximal section; and

a flexible tendon sheath coupled to said axial spine wherein said flexible tendon sheath is bonded to said axial spine at a distal section and a proximal section of said axial spine, said axial spine to resist axial compression along catheter proximal section.

35. A deflatable catheter assembly as in claim 29 further comprises,

an axial spine disposed around a first section of said tendon, said first section being substantially aligned with said catheter proximal section, said axial spine to resist axial compression along catheter proximal section; and

a first plurality of slip bands disposed around a distal section and a second plurality of slip bands disposed around a proximal section of said axial spine, wherein said needle is not wrapped around at said tendon at said distal section and said proximal section of said axial spine;

a flexible tendon sheath coupled to said axial spine wherein said flexible tendon sheath being substantially aligned with said catheter distal section and wherein said tendon is disposed into said tendon sheath.

36. A deflatable catheter assembly as in claim 29 further comprises,

an axial spine disposed within and along a first section of said tendon, said first section being substantially aligned with said catheter proximal section of said catheter shaft, said axial spine to resist axial compression along said first section;

a first plurality of slip bands disposed around a distal section of said axial spine and a second plurality of slip bands disposed around a proximal section of

said axial spine, wherein said needle is not wrapped around at said tendon at said distal section and said proximal section of said axial spine;

a flexible tendon sheath coupled to said axial spine wherein flexible tendon sheath being substantially aligned with said catheter distal section and wherein said tendon is disposed into said tendon sheath at said catheter distal section; and

an anchoring member disposed over each of said first plurality of slip bands and said second plurality of slip bands to prevent slipping of said axial spine.

37. A deflectable catheter assembly as in claim 29 further comprises,

an axial spine disposed within and along a first section of said tendon, said first section being substantially aligned with said catheter proximal section of said catheter shaft, said axial spine to resist axial compression along said first section;

a first plurality of slip bands disposed around a distal section of said axial spine and a second plurality of slip bands disposed around a proximal section of said axial spine, wherein said needle is not wrapped around at said tendon at said distal section and said proximal section of said axial spine;

a flexible tendon sheath coupled to said axial spine wherein flexible tendon sheath being substantially aligned with said catheter distal section and wherein said tendon is disposed into said tendon sheath at said catheter distal section; and

a stiffening member incorporated into said catheter shaft to control the deflection point of said catheter distal section.

38. A deflectable catheter assembly as in claim 29 further comprising:

a tip electrode located at the tip of said catheter distal section and coupled to a conductive lead that extends out of said catheter shaft.

39. A deflatable catheter assembly as in claim 29 further comprising:

a tip electrode located at the tip of said catheter distal section and coupled to a conductive lead that extends out of said catheter shaft; and

at least one additional electrode located proximally along said catheter distal section and closely to said tip electrode, said at least one additional electrode coupled to another conductive lead that extends out of said catheter shaft, wherein said tip electrode and said at least one additional electrode forming a bipolar electrode system.

40. A deflatable catheter assembly as in claim 29 further comprising:

a lumen filler disposed within said catheter shaft and around each of the lumens of said catheter shaft at said catheter distal section.

41. A deflatable catheter assembly as in claim 29 wherein catheter proximal section is further divided into a first catheter proximal section and a second catheter proximal section wherein said first catheter proximal section is more flexible than said second catheter proximal section.

42. A deflatable catheter assembly as in claim 29 wherein catheter proximal section is further divided into a first catheter proximal section and a second catheter proximal section wherein said first catheter proximal section is more flexible than

said second catheter proximal section and is less flexible than said catheter distal section.

43. A deflatable catheter assembly as in claim 29 wherein said first control mechanism includes a tendon control that deflects or relaxes said tendon to deflect said catheter distal section and said catheter handle further includes a second control mechanism that controls said needle disposed within said catheter shaft.
44. A deflatable catheter assembly as in claim 29 further comprising:  
a pre-shaped guide sheath disposed around said catheter shaft and extending from said catheter distal section to said catheter proximal section, said pre-shaped guide sheath being able facilitate the maneuvering of said catheter shaft through tortuous pathways.
45. A deflatable catheter assembly as in claim 29 further comprising:  
a pre-shaped guide sheath disposed around said catheter shaft and extending from said catheter distal section to said catheter proximal section, said pre-shaped guide sheath having at least one angular bend at a distal end to facilitate the maneuvering of said catheter shaft through tortuous pathways.
46. A deflatable catheter assembly as in claim 29 further comprising:  
a pre-shaped guide sheath disposed around said catheter shaft and extending from said catheter distal section to said catheter proximal section, said

pre-shaped guide sheath having a dual-angular bend at a distal end to facilitate the maneuvering of said catheter shaft through tortuous pathways.

47. A deflatable catheter assembly as in claim 29 further comprises a needle disposed within a needle tube, said needle tube disposed within said second lumen, said needle and said needle tube being extendable from and retractable into said catheter distal section and said needle being extendable from and retractable into said needle tube.
48. A deflatable catheter assembly as in claim 35 wherein each of a plurality of needles, which includes said needle, is wrapped around said tendon.
49. A deflatable catheter assembly as in claim 29 wherein said catheter assembly includes a plurality of needles, which includes said needle, and said catheter assembly further includes at least one inflatable balloon coupling to said plurality of needles, said inflatable balloon, when inflated, directs said plurality of needles to desired target sites.
50. A deflatable catheter assembly as in claim 29 wherein said needle further includes a divergent angle, said needle is disposed within a needle tube, said needle tube being extendable from and retractable into said catheter distal section and said needle being extendable from and retractable into said needle tube.

51. A deflectable catheter assembly as in claim 29 wherein said needle further comprises a plurality of injection openings disposed within a needle tube, said needle and said needle tube being extendable from and retractable into said catheter distal section and said needle being extendable from and retractable into said needle tube.
52. A deflectable catheter assembly as in claim 29 further comprises a needle stop mechanism configured to control the travel distance of said needle.
53. A deflectable catheter assembly as in claim 29 wherein said needle wraps around said tendon such that there is 1 complete wrap for every 3-25 cm catheter shaft length.
54. A deflectable catheter assembly as in claim 29 wherein said catheter shaft comprises at least one radiopaque marker to allow monitoring of said catheter shaft.
55. A deflectable catheter assembly as in claim 29 wherein said catheter shaft comprises at least one portion that is made of a magnetic resolution imaging material to allow monitoring of said catheter shaft.
56. A deflectable catheter assembly comprising:

a catheter shaft having a catheter proximal section and a catheter distal section, said catheter distal section being more flexible than said catheter proximal section;

a tendon is disposed within a first lumen of said catheter shaft, said tendon being able to deflect said catheter distal section when being pulled on;

a needle is disposed within said first lumen, said needle being retractable and extendable; and

a catheter handle coupled to said catheter shaft, said catheter handle including a first control mechanism to control said tendon and a second control mechanism to control said needle;

wherein along said catheter proximal section, said needle is approximately centrally located within said catheter shaft and said tendon is wrapped around said needle, and

wherein along said catheter distal section, said tendon is located off-center of said catheter shaft to allow defection of said catheter distal section and said tendon is not wrapped around said needle.

57. A deflectable catheter assembly comprising:

a catheter shaft having a catheter proximal section and a catheter distal section, said catheter distal section being more flexible than said catheter proximal section;

a tendon disposed within a first lumen of said catheter shaft, said first lumen being approximately centrally located within said catheter shaft at said catheter proximal section and said first lumen located proximate to an inner



sidewall of said catheter shaft at said catheter distal section, said tendon being able to deflect said catheter distal section when being pulled on;

a stiffening member disposed within a second lumen of said catheter shaft, said second lumen running parallel to said first lumen, at least at said catheter distal section; and

a catheter handle coupled to said catheter shaft, said catheter handle including a first control mechanism to control said tendon and a second control mechanism to control said stiffening member.

58. A deflectable catheter assembly as in claim 57 wherein said stiffening member controls the beginning of a deflection point for said catheter distal section.
59. A deflectable catheter assembly as in claim 57 wherein said stiffening member is advanceable and retractable relative to said tendon to vary the beginning of said deflection point for said catheter distal section.
60. A deflectable catheter assembly as in claim 57 wherein said stiffening member includes a bullet wire section with increased stiffness relative to the remaining section of said stiffening member.
61. A deflectable catheter assembly as in claim 57 further comprises a needle disposed within a third lumen of said catheter shaft and wherein said catheter handle further comprises a third control mechanism to control said needle.

62. A deflectable catheter assembly comprising:

a catheter shaft having a catheter proximal section and a catheter distal section, said catheter distal section being more flexible than said catheter proximal section;

a tendon disposed within a first lumen of said catheter shaft, said first lumen being approximately centrally located within said catheter shaft at said catheter proximal section and said first lumen located off-center of said catheter shaft at said catheter distal section, said tendon being able to deflect said catheter distal section when being pulled on;

a stiffening outer sheath moveably disposed around said catheter shaft and extending from catheter proximal section to a point along said catheter distal section that defines the beginning of a deflection point; and

a catheter handle coupled to said catheter shaft, said catheter handle including a first control mechanism to control said tendon and a second control mechanism to control said stiffening outer sheath.

63. A deflectable catheter assembly as in claim 62 wherein said stiffening outer sheath comprises a high durometer section that increases stiffness to said catheter shaft to control said deflection point.

64. A deflectable catheter assembly as in claim 62 further comprises a needle disposed within a second lumen of said catheter shaft.

65. A deflectable catheter assembly comprising:

a catheter shaft having a catheter proximal section and a catheter distal section, said catheter distal section being more flexible than said catheter proximal section;

a central tendon disposed within a first lumen of said catheter shaft, said first lumen being approximately centrally located within said catheter shaft and said first lumen extending a first section of said catheter shaft, said first section being substantially aligned with said catheter proximal section, said central tendon further includes a plurality of anchors extending outside of said first lumen;

a lateral tendon disposed within a second lumen of said catheter shaft, said second lumen being located approximately off-center of said catheter shaft, said second lumen being substantially aligned with said catheter proximal section, said lateral tendon further includes an anchor hook extending outside of said second lumen, said anchor hook capable of engaging any one of said plurality of anchors, wherein an engagement of said anchor hook to one of said plurality of anchors defines the beginning of a deflection point and pulling on said lateral tendon deflects said catheter distal section;

a catheter handle coupled to said catheter shaft, said catheter handle including a first control mechanism to control said lateral tendon.

66. A deflectable catheter assembly as in claim 65 wherein said anchor hook is configured to have an opening to allow disengagement of said anchor hook from said plurality of anchors, wherein said openings allow said anchor hook to slide off said plurality of anchors.

67. A deflectable catheter assembly as in claim 65 wherein said anchor hook is configured to have a “C” shape with an opening to allow disengagement of said anchor hook from said plurality of anchors, wherein said openings allow said anchor hook to slide off said plurality of anchors.
68. A deflectable catheter assembly as in claim 65 further comprises a needle disposed within a third lumen of said catheter shaft and wherein said catheter handle further includes a second control mechanism to control said needle.
69. A deflectable catheter assembly comprising:
- a catheter shaft having a catheter proximal section and a catheter distal section, said catheter distal section being more flexible than said catheter proximal section;
  - a tendon is disposed within a first lumen of said catheter shaft, said first lumen being approximately centrally located within said catheter shaft at said catheter proximal section and said first lumen located off-center of said catheter shaft at said catheter distal section, said tendon being able to deflect said catheter distal section when being pulled on; and
  - a catheter handle coupled to said catheter shaft, said catheter handle includes a first control mechanism that controls said tendon, and said catheter handle further comprising:
    - an inner housing and an outer housing moveable relative to each other;

wherein said first control mechanism is moveably disposed within said inner housing, said first control mechanism is fixedly attached to said outer housing and coupled to said tendon, wherein moving said outer housing relative to said inner housing moves said first control mechanism and said tendon.

70. A deflatable catheter assembly as in claim 69 wherein said inner housing includes a distal end, a proximal end, an inner surface, and an outer surface, wherein at least one elastomer ring is mounted on said outer surface to create friction between said inner housing and said outer housing.
71. A deflatable catheter assembly as in claim 70 wherein said distal end of said inner housing is coupled to a distal adapter having a catheter holder coupled thereto, said catheter holder to couple said catheter proximal section to said catheter handle.
72. A deflatable catheter assembly as in claim 71 wherein said first control mechanism includes a plurality of openings wherein said tendon is disposed through one of said plurality of openings.
73. A deflatable catheter assembly as in claim 72 wherein said proximal end of said inner housing is coupled to a proximal adapter to couple said inner housing to a second control mechanism, said second control mechanism to control a device that are disposed within said catheter shaft.

74. A deflectable catheter assembly as in claim 73 wherein said device includes a needle.
75. A deflectable catheter assembly as in claim 73 wherein said needle is disposed through one of said plurality of openings in said first control mechanism and said needle is further coupled to a second control mechanism, said second control mechanism controls the movement of said needle.
76. A deflectable catheter assembly comprising:
- a catheter shaft having a catheter proximal section and a catheter distal section, said catheter distal section being more flexible than said catheter proximal section;
  - a plurality of tendons disposed within said catheter shaft, said plurality of tendons being disposed within said catheter shaft, said plurality of tendons being approximately centrally located within said catheter shaft at said catheter proximal section and each of said plurality of tendons dispersed radially off-center of said catheter shaft at said catheter distal section, said plurality of tendons being able to deflect said catheter distal section in multiple radial directions; and
  - a catheter handle coupled to said catheter shaft at said catheter proximal section, said catheter handle including a mechanism to move said plurality of tendons to deflect said catheter distal section wherein said catheter handle enables multiple radial directions of deflection.

77. A deflectable catheter assembly as in claim 76 wherein each of said plurality of tendons is housed in an individual lumen.
78. A deflectable catheter assembly as in claim 76 wherein said catheter handle comprises a steering plate, each of said plurality of tendons coupled to said steering plate, and wherein tilting said steering plate allows defection of said catheter distal section in a desired radial direction.
79. A deflectable catheter assembly as in claim 76 wherein said catheter handle comprises a pull knob for each of said plurality of tendons wherein pulling on said pull knob controls one of said plurality of tendons associated with said pull knob to deflect said catheter distal section in a desired radial direction.
80. A deflectable catheter assembly as in claim 76 wherein said catheter handle comprising:  
a steering plate, each of said plurality of tendons is coupled to said steering plate, and wherein tilting said steering plate allows defection of said catheter distal section in a desired radial direction; and  
a push-tilt mechanism having an extension that is engageable to said steering plate, wherein said push-tilt mechanism applies force to tilt said steering plate.
81. A deflectable catheter assembly as in claim 76 wherein said catheter handle comprises wherein said catheter handle comprises:

a steering plate, each of said plurality of tendons is coupled to said steering plate, and wherein tilting said steering plate allows deflection of at least one of said plurality of tendons but not all of said plurality of tendons and wherein deflecting said at least one tendon allows deflection of said catheter distal section in a desired radial direction;

a push-tilt mechanism having an extension that is engageable to said steering plate, wherein said push-tilt mechanism applies force to tilt said steering plate; and

a rotating lever coupled to said push-tilt mechanism, said rotating lever rotates said extension along said steering plate.

82. A deflectable catheter assembly as in claim 76 wherein each of said plurality of tendons anchored to an attachment point located at or proximate a distal tip area of catheter distal section.
83. A deflectable catheter assembly as in claim 76 wherein each of said plurality of tendons anchored to a different attachment point along said catheter distal section to allow various deflection points for said catheter distal section.
84. A deflectable catheter assembly as in claim 76 further comprises at least one needle disposed within a second lumen of said catheter shaft.



85. A deflectable catheter assembly as in claim 84 wherein said second lumen is approximately centrally located within said catheter shaft at said catheter distal section.
86. A deflectable catheter assembly comprising:
- a catheter shaft having a catheter proximal section and a catheter distal section, said catheter distal section being more flexible than said catheter proximal section;
  - a tendon is disposed within a first lumen of said catheter shaft, said first lumen being approximately centrally located within said catheter shaft at said catheter proximal section and said first lumen located off-center of said catheter shaft at said catheter distal section, said tendon being able to deflect said catheter distal section when being pulled on;
  - a compression cage having a proximal end, a distal end and a lumen there between, said compression cage sized to fit within said catheter distal section and configured to deflect laterally relative to the centerline of said catheter shaft and to resist axial compression along said centerline; and
  - a catheter handle coupled to said catheter shaft, said catheter handle including a first control mechanism to control said tendon.
87. A deflectable catheter assembly as in claim 86 wherein said compression cage comprises a helical coil defining said lumen and at least one strut secured to one side of said helical coil throughout the length of said helical coil.

88. A deflatable catheter assembly as in claim 86 wherein said compression cage comprises a helical coil defining said lumen and at least one strut secured to one side of said helical coil throughout the length of said helical coil and wherein said compression cage comprises a pair of struts secured to diametrically opposite sides of said helical coil.
89. A deflatable catheter assembly as in claim 86 wherein said compression cage is formed of a resiliently deformable, shape-memory material.
90. A deflatable catheter assembly as in claim 86 wherein said compression cage comprises a linear array of hollow rings defining said lumen and at least one strut secured to one side of each of said rings.
91. A deflatable catheter assembly as in claim 86 wherein said compression cage comprises a linear array of hollow rings defining said lumen and a pair of struts secured diametrically opposite sides of each of said hollow rings.
92. A deflatable catheter assembly as in claim 86 wherein said compression cage comprises a linear array of hollow rings defining said lumen and at least one strut secured to one side of each of said rings and wherein said compression cage is formed of a resiliently deformable, shape-memory material.
93. A deflatable catheter assembly as in claim 86 wherein said compression cage comprises a substantially tubular member with an array of notches.

94. A deflectable catheter assembly as in claim 86 wherein said compression cage comprises a substantially tubular member with an array of notches, said notches are diametrically opposite and offset from each other.
95. A deflectable catheter assembly as in claim 86 wherein said compression cage comprises a substantially tubular member with an array of notches, and wherein said compression cage is formed of a resiliently deformable, shape-memory material.
96. A method of making a deflectable catheter assembly comprising:  
disposing a tendon within a first lumen of a catheter shaft, said tendon being approximately centrally located within a catheter proximal section of said catheter shaft, said tendon being located off-center within a catheter distal section of said catheter shaft;  
coupling a catheter handle to said catheter shaft at said catheter proximal section, said catheter handle including a first control mechanism to control said tendon.
97. The method of claim 96 further comprising:  
wrapping a needle around said tendon at said catheter proximal section;  
and

unwrapping said needle from said tendon at said catheter distal section, wherein said catheter handle includes a second control mechanism to control said needle.

98. The method of claim 97 wherein said needle is placed approximately at the center of said catheter shaft at said catheter distal section.

99. The method of claim 96 further comprising:

disposing a stiffening member within a second lumen of said catheter shaft, said second lumen being proximate and parallel to said first lumen, at least at said catheter distal section, wherein said catheter handle including a third control mechanism to control said stiffening member.

100. The method of claim 99 further comprising:

disposing a needle within said catheter shaft.

101. The method of claim 96 further comprising:

disposing a needle within a third lumen of said catheter shaft wherein said third lumen is approximately centrally located within said catheter shaft at said catheter distal section and is located off-center within said catheter shaft at said catheter proximal section.

102. The method of claim 96 further comprising:

disposing a stiffening outer sheath around said catheter shaft, said stiffening outer sheath is longitudinally moveable along said catheter shaft and extending from catheter proximal section to a point along said catheter distal section that defines the beginning of a deflection point, and providing a fourth control mechanism to control said a stiffening outer sheath.

103. The method of claim 96 further comprising:

coupling a stiffening component to said catheter shaft to control stiffness along said catheter shaft, said stiffening component includes a stiffening member coupling to a push shaft that controls the movement of said stiffening member.

104. The method of claim 96 further comprises disposing an axial spine over said tendon for a first section of said tendon, said first section being substantially aligning with said catheter proximal section, said axial spine to resist axial compression along said catheter shaft.

105. The method of claim 96 further comprises incorporating an electrode system to said catheter shaft.

106. The method of claim 96 further comprises coupling a pre-shaped guide sheath around said catheter shaft to facilitate the maneuvering of said catheter shaft through tortuous pathways.

107. The method of claim 96 further comprising:

wrapping said tendon around a therapeutic tool that is disposed approximately in the center of said catheter shaft at said catheter proximal section; and

unwrapping said tendon from said therapeutic tool at said catheter distal section and positioning said tendon to an off-center location within said catheter shaft at said catheter distal section.

108. The method of claim 107 wherein said therapeutic tool being a needle.

109. A method of making a deflectable catheter assembly comprising:

disposing a central tendon within a first lumen provided within a catheter shaft, said first lumen being approximately centrally located within said catheter shaft and extending along a first section of said catheter shaft, said central tendon including a plurality of anchors extending outside of said first lumen;

disposing a lateral tendon within a second lumen provided within said catheter shaft, said second lumen being located approximately off-center of said catheter shaft and extending along said first section of said catheter shaft, said lateral tendon including an anchor hook extending outside of said second lumen, said anchor hook capable of engaging anyone of said plurality of anchors, wherein an engagement of said anchor hook to any one of said plurality of anchors defines the beginning of a deflection point for said catheter distal section and pulling on said lateral tendon deflects said catheter distal section at said deflection point; and

coupling a catheter handle to said catheter shaft, said catheter handle including a first control mechanism to control said lateral tendon.

110. The method of claim 109 wherein pulling on said lateral tendon causes an engagement of said anchor hook to one of said plurality of anchors on said central tendon and causing deflection of said catheter distal section.
111. A method of making deflectable catheter assembly comprising:
- disposing a plurality of tendons within a catheter shaft, said plurality of tendons being disposed within said catheter shaft, said first lumen being approximately centrally located within said catheter shaft at a catheter proximal section of said catheter shaft and each of said plurality of tendons dispersed radially off-center of said catheter shaft at a catheter distal section of said catheter shaft;
  - wherein said plurality of tendons being able to deflect said catheter distal section in multiple radial directions; and
  - coupling a catheter handle to said catheter shaft, said catheter handle including a mechanism to move said plurality of tendons to deflect said catheter distal section wherein said catheter handle enables multiple radial directions of deflection.
112. The method as in claim 111 further comprises coupling a steering plate to said catheter handle, each of said plurality of tendons couples to a point on said steering plate wherein tilting said steering plate causes a deflection and controls a deflection direction of said catheter distal section.

113. The method as in claim 112 further comprises coupling a push-tilt mechanism having an extension that is engageable to said steering plate, wherein moving said push-tilt controls said steering plate.
114. The method as in claim 113 further comprises coupling a rotating lever to said push-tilt mechanism, said rotating lever to rotate said extension along said steering plate to control the steering of said steering plate.
115. A deflectable catheter assembly as in claim 2 further comprises a pressure sensor system coupling to said needle, said pressure sensor allows for fluid pressure measurements to indicate penetration depth for said needle.
116. A deflectable catheter assembly as in claim 115 wherein said needle includes a first end and a second end, said needle further having at least one aperture located a predetermined distance from the first end and said pressure sensor system coupled with a portion of said needle to measure pressure of a fluid dispensed in said needle, said pressure measurement assembly measuring a first pressure with said fluid dispensed in said needle, a second pressure when said needle contacts tissue before said aperture becomes occluded and a third pressure as said needle penetrates tissue and said aperture becomes occluded.
117. A deflectable catheter assembly as in claim 29 further comprises a pressure sensor system coupling to said needle, said pressure sensor allows for fluid pressure measurements to indicate penetration depth for said needle.



118. A deflectable catheter assembly as in claim 117 wherein said needle includes a first end and a second end, said needle further having at least one aperture located a predetermined distance from the first end and said pressure sensor system coupled with a portion of said needle to measure pressure of a fluid dispensed in said needle, said pressure measurement assembly measuring a first pressure with said fluid dispensed in said needle, a second pressure when said needle contact tissue before said aperture becomes occluded and a third pressure as said needle penetrates tissue and said aperture becomes occluded.
119. A deflectable catheter assembly as in claim 61 further comprises a pressure sensor system coupling to said needle, said pressure sensor allows for fluid pressure measurements to indicate penetration depth for said needle.
120. A deflectable catheter assembly as in claim 119 wherein said needle includes a first end and a second end, said needle further having at least one aperture located a predetermined distance from the first end and said pressure sensor system coupled with a portion of said needle to measure pressure of a fluid dispensed in said needle, said pressure measurement assembly measuring a first pressure with said fluid dispensed in said needle, a second pressure when said needle contacts tissue before said aperture becomes occluded and a third pressure as said needle penetrates tissue and said aperture becomes occluded.

121. A deflectable catheter assembly as in claim 64 further comprises a pressure sensor system coupling to said needle, said pressure sensor allows for fluid pressure measurements to indicate penetration depth for said needle.
122. A deflectable catheter assembly as in claim 121 wherein said needle includes a first end and a second end, said needle further having at least one aperture located a predetermined distance from the first end and said pressure sensor system coupled with a portion of said needle to measure pressure of a fluid dispensed in said needle, said pressure measurement assembly measuring a first pressure with said fluid dispensed in said needle, a second pressure when said needle contacts tissue before said aperture becomes occluded and a third pressure as said needle penetrates tissue and said aperture becomes occluded.
123. A deflectable catheter assembly as in claim 68 further comprises a pressure sensor system coupling to said needle, said pressure sensor allows for fluid pressure measurements to indicate penetration depth for said needle.
124. A deflectable catheter assembly as in claim 123 wherein said needle includes a first end and a second end, said needle further having at least one aperture located a predetermined distance from the first end and said pressure sensor system coupled with a portion of said needle to measure pressure of a fluid dispensed in said needle, said pressure measurement assembly measuring a first pressure with said fluid dispensed in said needle, a second pressure when said needle contacts

tissue before said aperture becomes occluded and a third pressure as said needle penetrates tissue and said aperture becomes occluded.

125. A deflatable catheter assembly as in claim 84 further comprises a pressure sensor system coupling to said needle, said pressure sensor allows for fluid pressure measurements to indicate penetration depth for said needle.

126. A deflatable catheter assembly as in claim 125 wherein said needle includes a first end and a second end, said needle further having at least one aperture located a predetermined distance from the first end and said pressure sensor system coupled with a portion of said needle to measure pressure of a fluid dispensed in said needle, said pressure measurement assembly measuring a first pressure with said fluid dispensed in said needle, a second pressure when said needle contacts tissue before said aperture becomes occluded and a third pressure as said needle penetrates tissue and said aperture becomes occluded.

127. The method of claim 97 further comprises a pressure sensor system coupling to said needle, said pressure sensor allows for fluid pressure measurements to indicate penetration depth for said needle.

128. The method of claim 127 wherein said needle includes a first end and a second end, said needle further having at least one aperture located a predetermined distance from the first end and said pressure sensor system coupled with a portion of said needle to measure pressure of a fluid dispensed in said needle, said pressure

measurement assembly measuring a first pressure with said fluid dispensed in said needle, a second pressure when said needle contacts tissue before said aperture becomes occluded and a third pressure as said needle penetrates tissue and said aperture becomes occluded.

129. The method of claim 109 further comprises disposing a needle within a third lumen within said catheter shaft.
130. The method of claim 129 further comprises coupling a pressure sensor system coupling to said needle, said pressure sensor allows for fluid pressure measurements to indicate penetration depth for said needle.
131. The method of claim 130 wherein said needle includes a first end and a second end, said needle further having at least one aperture located a predetermined distance from the first end and said pressure sensor system coupled with a portion of said needle to measure pressure of a fluid dispensed in said needle, said pressure measurement assembly measuring a first pressure with said fluid dispensed in said needle, a second pressure when said needle contacts tissue before said aperture becomes occluded and a third pressure as said needle penetrates tissue and said aperture becomes occluded.
132. The catheter assembly of claim 2 wherein the needle is made of a polymer material.

133. The catheter assembly of claim 29 wherein the needle is made of a polymer material.
134. The catheter assembly of claim 56 wherein the needle is made of a polymer material.
135. The catheter assembly of claim 61 wherein the needle is made of a polymer material.
136. The catheter assembly of claim 64 wherein the needle is made of a polymer material.
137. The catheter assembly of claim 68 wherein the needle is made of a polymer material.